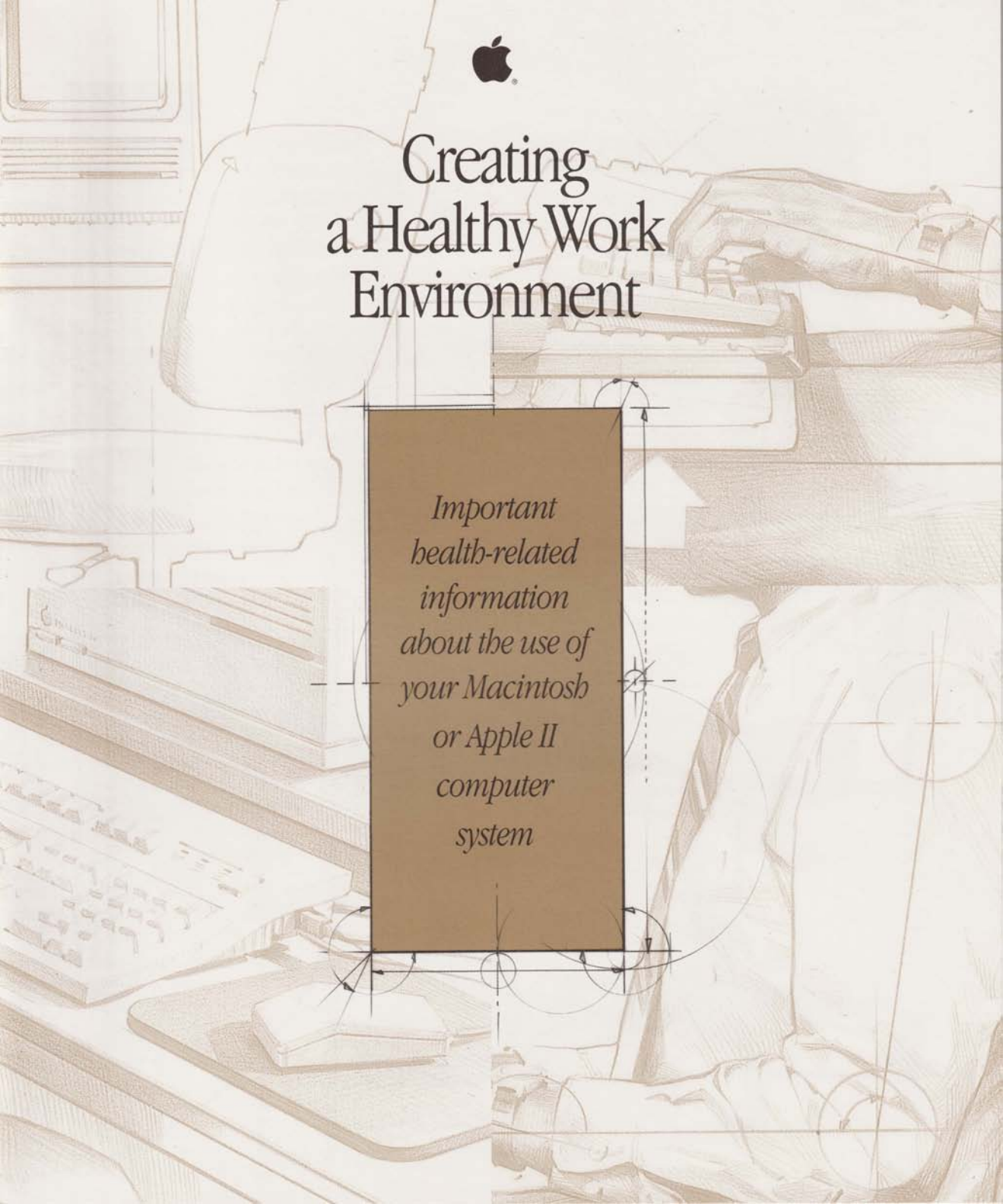


Creating a Healthy Work Environment

Important health-related information about the use of your Macintosh or Apple II computer system

18 TO 28 INCHES
DISPLAY AT EYE LEVEL OR SLIGHTLY BELOW
SOFT INCOMING LIGHT
KEYBOARD AT ELBOW HEIGHT
KEEP WELL VENTILATED
THIGH PARALLEL TO FLOOR
FEET FLAT ON FLOOR OR FOOTREST

Introduction

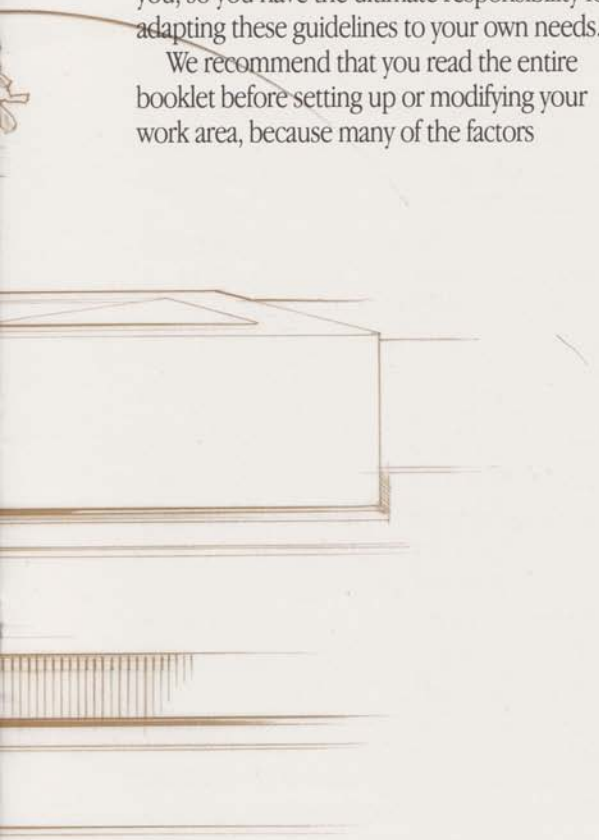
As part of our ongoing concern for the health and productivity of our customers, Apple Computer wants you to understand how to properly set up and use our computer systems. This booklet offers guidelines for choosing a desk and chair, positioning the keyboard and display, and adjusting the room lighting. It also includes suggestions for healthy work patterns, such as taking frequent rest breaks.

Of course, only you can tell what's best for you, so you have the ultimate responsibility for adapting these guidelines to your own needs.

We recommend that you read the entire booklet before setting up or modifying your work area, because many of the factors discussed here are interrelated and a change to one will often affect another. For example, changing the height of your chair will change the angle at which you view the display and type on the keyboard.

This booklet was written with Apple® desktop computer systems in mind. When setting up a Macintosh® PowerBook™ system, the basic principles discussed here will still apply, but you may have to modify specific suggestions. For example, the displays on these systems have unique lighting needs, so you may have to adjust the angle of the screen or the room lighting.

Also, because you're likely to use portable computers away from your normal work area, you may not have as much control over lighting, desk height, and other factors. In that case, keep these suggestions in mind as much as possible, and use all the adjustments available on your computer to set it up for comfortable use. If you use a portable computer in your office, follow the guidelines for setting up desktop systems. For example, you can connect a separate display to give you more control over your viewing angle.



Health concerns associated with computer use

Muscle soreness, eye fatigue, and other discomforts and injuries sometimes associated with using computers can actually occur from performing any number of activities. In fact, misuse of the same muscles during multiple activities can create a problem that might not otherwise exist. For example, if you engage in nonwork activities that involve repetitive stress on the wrist—such as bicycling—and also use your computer's keyboard improperly, you may increase your likelihood of developing wrist problems. Preventing health problems is a multifaceted task that requires careful attention to the way you use your body every hour of every day.

The most common health effects associated with using a computer are musculoskeletal discomfort and eye fatigue. Some people have also raised questions about exposure to electromagnetic fields. We'll discuss each area of concern below.

Musculoskeletal discomfort

As with any activity that involves sitting for long periods of time, using a computer can make your muscles sore and stiff. To minimize these effects, set up your work environment carefully (using the guidelines in this booklet) and take frequent breaks to rest tired muscles.

Another type of musculoskeletal concern is repetitive stress injuries (RSIs), also known as cumulative trauma disorders (CTDs). These problems can occur when a certain muscle or tendon is repeatedly overused and forced into an unnatural position. The exact causes of RSIs are not totally understood, but in addition to an awkward posture, such factors as the amount of repetition, the force used in the activity, and the individual's physiology and lifestyle may affect the likelihood of experiencing an RSI.

RSIs did not suddenly arise when computers were invented; tennis elbow and writer's cramp, for example, are two well-known RSIs that have been with us for a long time. One RSI discussed more often today, however, is a wrist problem called carpal tunnel syndrome, which may be aggravated by improper use of computer keyboards. This nerve disorder results from excessive pressure on the median nerve as it passes through the wrist to the hand.

This booklet offers extensive advice on setting up your desk, chair, and keyboard to minimize the possibility of developing an RSI. As mentioned earlier, however, the effects of repetitive movements associated with using a computer can be compounded by those of other work and leisure activities to produce or aggravate physical problems, so proper use of your computer system must be considered as just one element of a healthy lifestyle.

No one, of course, can guarantee that you won't have problems even when you follow the most expert advice on using computer equipment. You should always check with a qualified health specialist if muscle, joint, or eye problems occur.

Eye fatigue

Eye fatigue can occur whenever the eyes are focused on a nearby object for a long time. This problem occurs because the eye muscles must work harder to view an object that's closer than about 20 feet (6 meters). Improper lighting can hasten the development of this problem. Although eye fatigue is annoying, there's no evidence that it causes permanent damage.

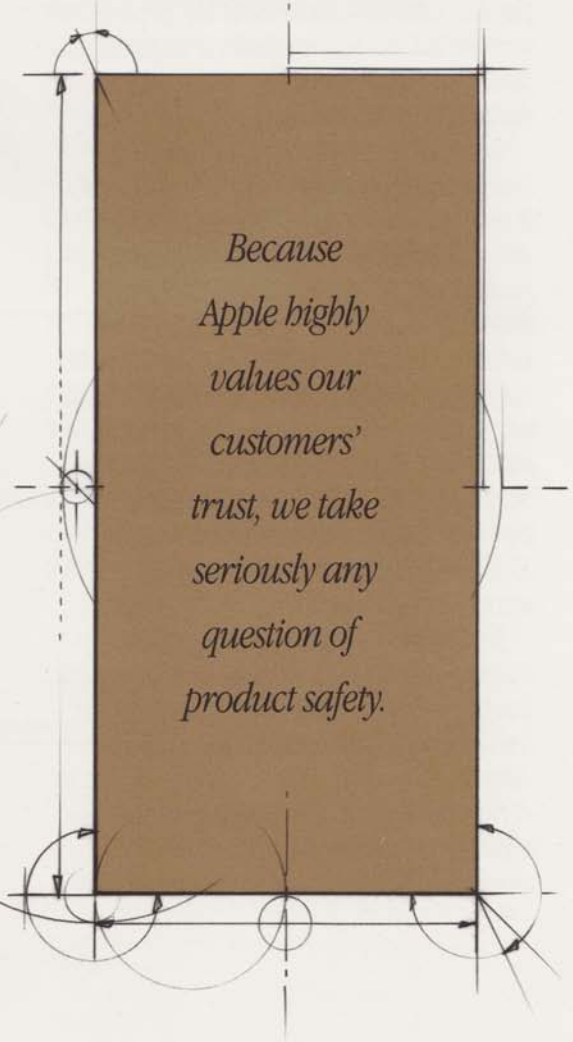
Whenever you're engaged in an activity that involves close-up work—such as reading a magazine, doing craft work, or using a computer—be sure to have sufficient glare-free lighting, give your eyes frequent rest breaks by looking up and focusing on distant objects, and remember to have your eyes examined regularly.

What about electromagnetic emissions?

Recently, questions about the possible health effects of prolonged exposure to extremely low frequency (ELF) and very low frequency (VLF) electromagnetic fields have been raised. The issue encompasses not only video display terminals (computer displays), but also other electromagnetic sources such as electrical wiring, televisions, and household appliances.

Because Apple highly values our customers' trust, we take seriously any question of product safety. We have reviewed the scientific reports and sought the counsel of government regulatory agencies and respected health organizations. Based on the prevailing evidence and opinions, Apple believes that the electric and magnetic fields produced by computer displays do not pose a health risk.

In response to those customers who want to reduce their exposure to electromagnetic fields, Apple is taking steps to lower the emission levels of our products. We are also actively encouraging further scientific research so we can continue to promote the health and safety of our customers and employees.



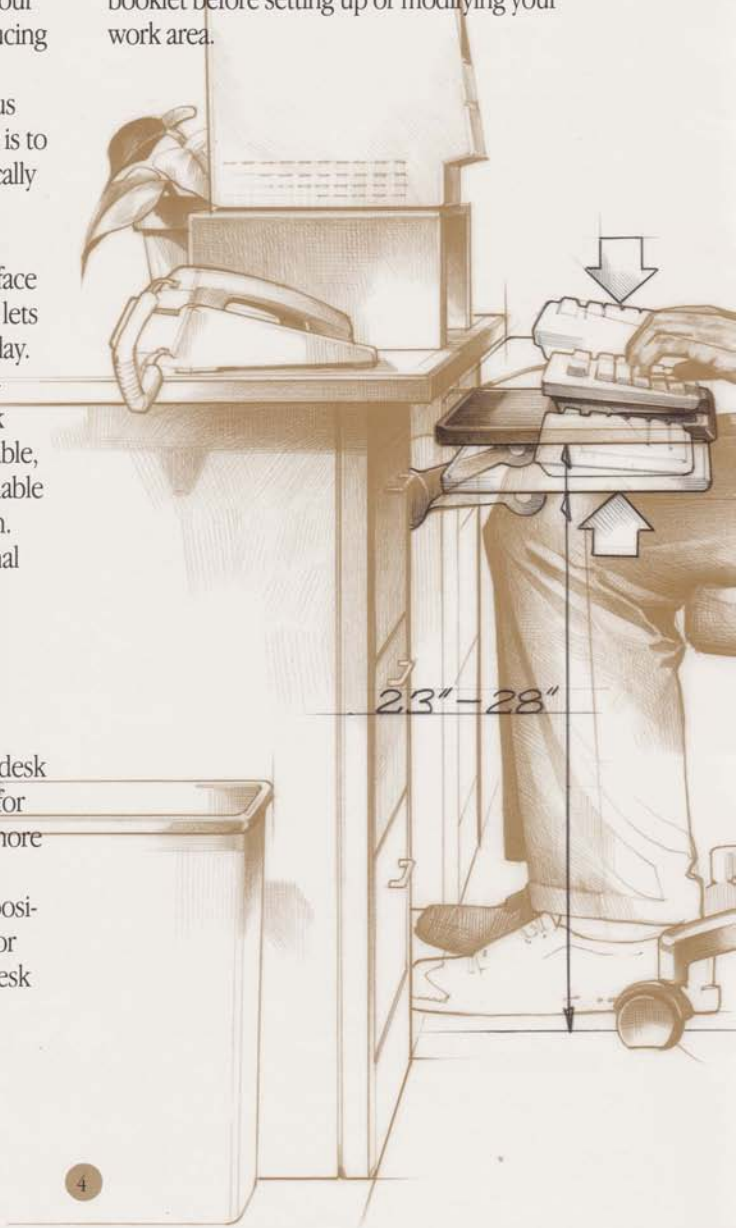
Selecting a computer desk

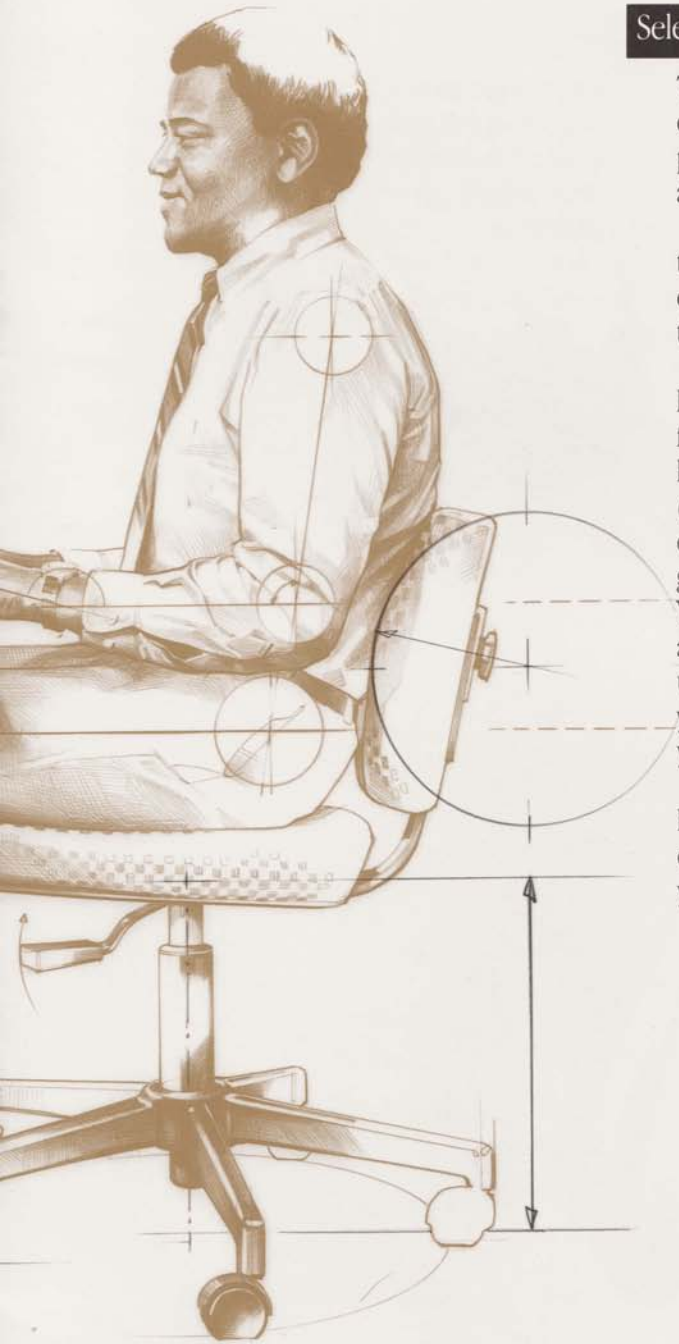
A desk that's at an ideal height for pen-and-paper writing is often too high for comfort when typing on a computer keyboard or looking at a display. Proper angles between your arms and your hands, and between your head and your body, are important in reducing the likelihood that you'll experience the physical disorders discussed in the previous section. For this reason, the ideal situation is to place your Apple system on a desk specifically designed for computers.

One such possibility is a modular desk system that allows you to set the work surface at any of several heights. This type of desk lets you lower both the keyboard and the display. Another option is to use a desk with a keyboard tray that's lower than the main work surface. Even if the tray height isn't adjustable, careful adjustment of your chair should enable you to find a comfortable working position. (In the United States, the American National Standards Institute has determined that a keyboard support surface that's between 23 and 28 inches high [58 to 71 cm] will accommodate most users.)

If you have a modular Apple computer system, you may want to consider using a desk that has a separate shelf or a support arm for the computer. This frees the desktop for more versatile placement of the display.

See the sections of this booklet about positioning your chair, keyboard, and display for more advice on determining the proper desk height for your Apple system. Because the positions of the elements of your desk and computer are closely interrelated, we suggest that you read all of the relevant parts of this booklet before setting up or modifying your work area.





Selecting and adjusting your chair

The chair you sit in when using your Apple computer system must be comfortable and provide firm support. Your chair should be adjustable to your unique needs.

Select a chair that provides good support to the lower back (lumbar region), and follow the chair manufacturer's directions for adjusting the back rest to fit your body properly.

The seat of your chair should be adjusted low enough that your feet can rest flat on the floor, yet high enough that your forearms and hands are at the proper angle to the keyboard (see the next section of this booklet). If you can't find a height that meets both of these goals, give priority to the position of your arms. You can always use a footrest to make up for any gap between the floor and your feet. If you use a footrest, it should be high enough so that your thighs are horizontal, or nearly so, when you're sitting.

Alternatively, you may be able to lower the keyboard so that your chair can be lower. However, try not to place the keyboard so low that your forearms have to drop down to reach it.

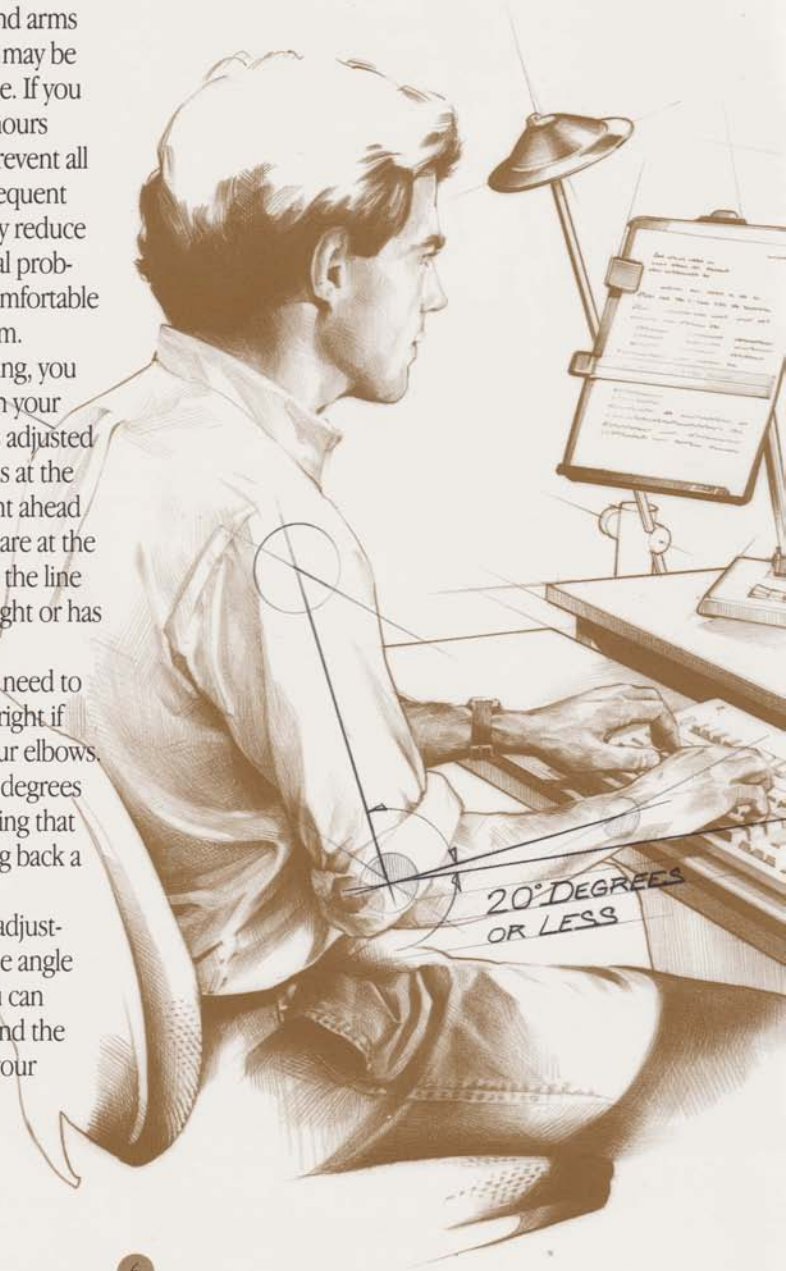
Positioning the keyboard

The more you use a computer, the more important it is to position the keyboard properly. Muscle strain to the neck and arms is a common physical complaint that may be aggravated by excessive computer use. If you work with your computer for many hours each day, even the best setup can't prevent all problems, so it's important to take frequent rest breaks. But the proper setup may reduce your likelihood of developing physical problems and allow you to enjoy many comfortable hours working with your Apple system.

To create the best position for typing, you may need to adjust the height of both your chair and the keyboard. Everything is adjusted correctly if, when you bend your arms at the elbow and hold your forearms straight ahead and parallel to the floor, your elbows are at the same height as the keyboard. That is, the line from your elbow to your hand is straight or has only a slight upward tilt of the wrist.

When typing, your forearms don't need to be exactly parallel to the floor; it's all right if your hands are a little higher than your elbows. Don't hold your hands more than 20 degrees above the horizontal, though (assuming that you're sitting upright; if you're leaning back a bit, the angle can be a little steeper).

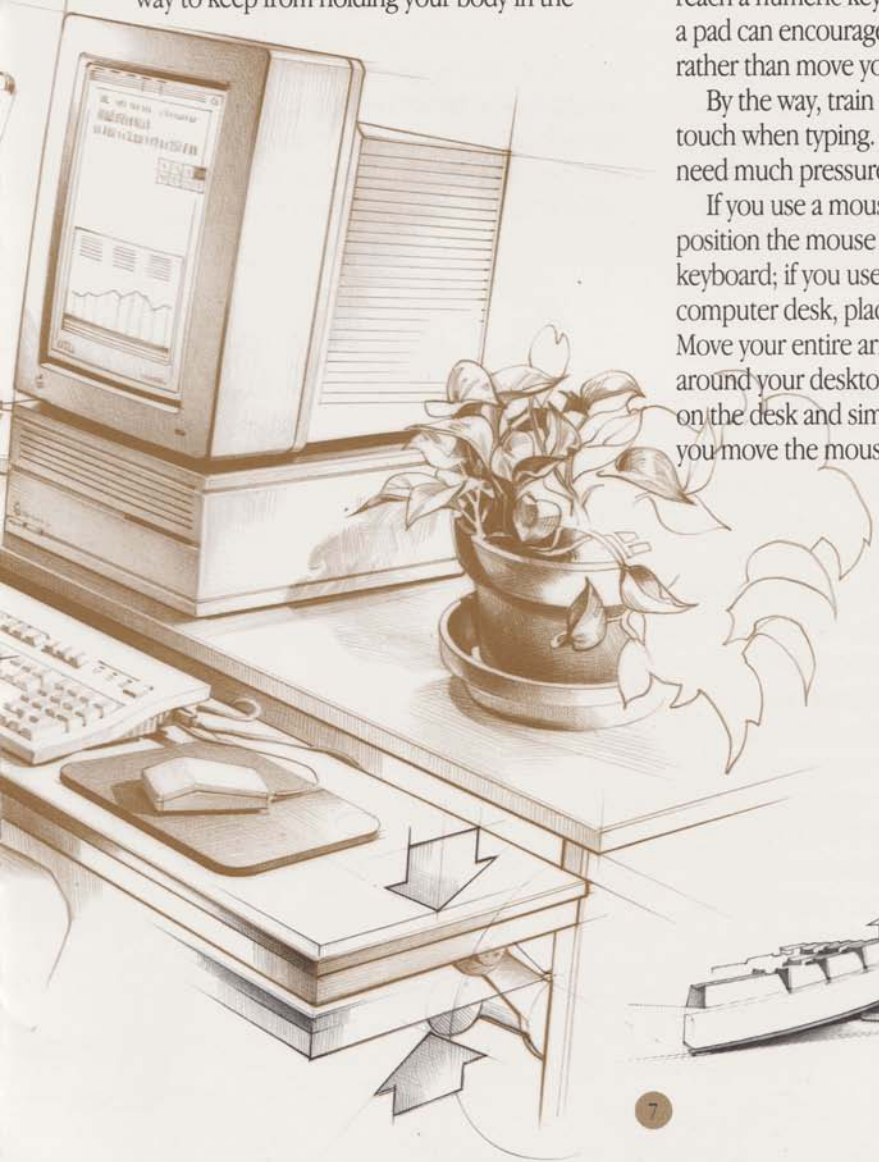
Some Apple keyboards have a tilt adjustment that enables you to fine-tune the angle between your forearm and hand; you can experiment with this adjustment to find the most comfortable position. Refer to your Apple computer owner's manual for more information.

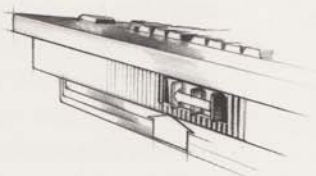


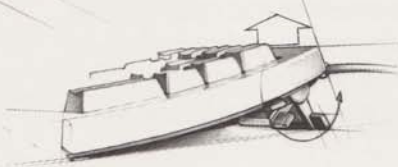
Most experts agree that when you're typing, your hands should be held so that your wrists are "floating" above the keyboard, as if you were playing a piano. However, when it's time to reread what you've typed, you may want to lower your hands to the desk. This is a good way to keep from holding your body in the same position too long. If you like, a wrist pad that sits on the desk in front of the keyboard can be used for these rest periods. Ideally, you shouldn't rest your wrists on the pad while typing. Your hands should be free to move forward, backward, and sideways (such as to reach a numeric keypad), and resting them on a pad can encourage you to bend your wrists rather than move your hands.

By the way, train yourself to use a light touch when typing. Computer keyboards don't need much pressure to respond.

If you use a mouse with your Apple system, position the mouse at the same height as your keyboard; if you use a keyboard tray on your computer desk, place the mouse there, too. Move your entire arm when sliding the mouse around your desktop; avoid resting your arm on the desk and simply bending your wrist as you move the mouse.







If your Apple keyboard has a tilt adjustment, experiment with various keyboard angles to find the most comfortable position.

Positioning the display

The most important factors when setting up the display for your Apple system are placing it at the proper height and positioning it so it doesn't reflect light into your eyes. You also need to set it at a comfortable distance for viewing, and adjust the brightness and contrast controls properly.

Most people prefer to look down slightly when viewing a display. That is, the top of the screen should be at or slightly below your eye level. If you have a modular Apple computer system, you can place the display on top of the computer or on a monitor stand. If the top of the screen is too high when you place the display on top of the computer, you may want to move the computer off the desktop and use a stand for the display. Consult your Apple computer owner's manual for more information about acceptable locations for the computer other than the desktop.

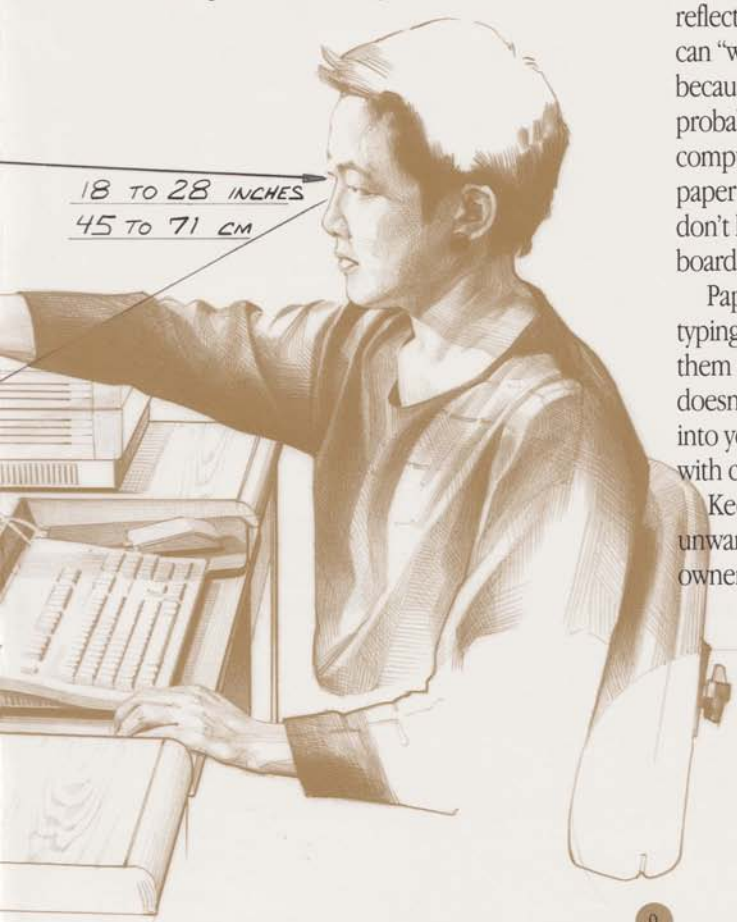
It's important to eliminate any direct light falling on the screen that could reflect back into your eyes, because such glare can hasten eye fatigue. Though this goal will be accomplished mostly by repositioning lamps, adjusting window blinds, and so on, correct placement of the display will also help. Even a slight horizontal swivel or vertical tilt of the display may eliminate annoying reflections. Antiglare filters are also available for computer displays, but if you use one, make sure it doesn't interfere with the clarity of the screen.

The best distance from your eyes to the screen is entirely up to you, although most people seem to prefer 18 to 28 inches (45 to 71 cm). It's important to have a desktop that's deep enough for you to set the display back as far as you like. Or use a desk that has a keyboard tray extending from the front so that you aren't sitting right at the edge of the desk when you're typing.

Set the brightness and contrast of the display to comfortable levels. An image that's too dark can be difficult to read, and one that's too bright can blur the characters on the screen. Read your display owner's manual for more details. If your work area receives natural light, you may need to adjust the brightness and contrast controls during the day as outside lighting conditions change.

Controlling lighting

If you have a modular Apple computer system, you may want to use one of Apple's tiltable monitor stands. A monitor stand will allow you to set the screen at the best angle for viewing, and will help to reduce or eliminate glare from lighting sources you can't move. Stands for compact Macintosh computers (such as the Macintosh Classic®) are also available, from independent vendors. If you own a Macintosh PowerBook computer, you can add a separate, external display for greater screen position flexibility.



Lighting for your work area must provide enough illumination for your keyboard, screen, and paper documents, without shining directly into your eyes or causing reflections from the screen.

Don't set up the display right in front of a window—or if you must, use blinds or curtains to soften the incoming light. Similarly, sunlight coming from directly behind you can cause undesirable glare from the screen.

As for artificial lighting, position lamps so they don't shine directly into your eyes or reflect off the screen. Because high light levels can "wash out" the display's image, and because displays are self-illuminating, you'll probably need less light when using your computer than when working with pen and paper or a typewriter. But make sure that you don't have to strain to read the screen, keyboard, or documents.

Paper documents you need to refer to while typing should be well illuminated, but position them so that any light directed on them doesn't reflect off the screen and send a glare into your eyes. A document holder may help with correct placement.

Keeping the screen clean helps to reduce unwanted reflections. Check your display owner's manual for cleaning instructions.

A note about laser printers

Ozone gas, which can be a mild to severe irritant, is emitted in detectable levels by almost all laser printers (and photocopiers) as a by-product of the electrophotographic process. Fortunately, ozone (chemical symbol O_3) is an unstable molecule that quickly breaks down to oxygen (O_2). Proper setup and maintenance of laser printers can allow this natural process to occur unimpeded.

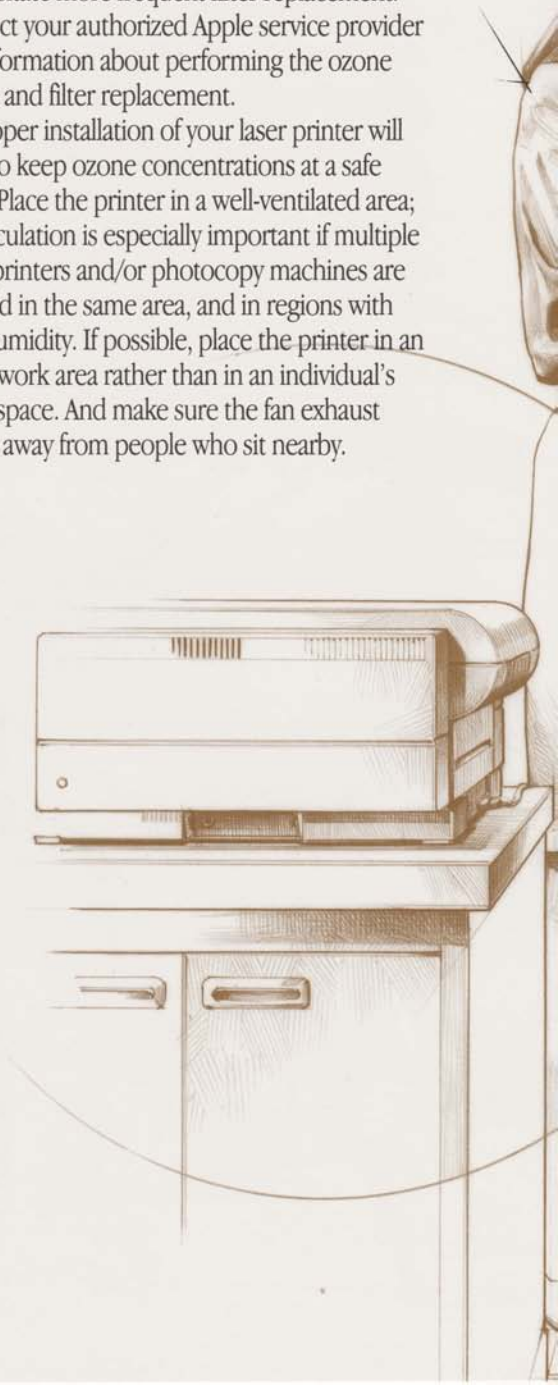
In laser printers, the primary source of ozone is the corona wire, which produces an electrical discharge that makes the toner powder temporarily adhere to the print drum just before the paper passes over the drum. *Ozone is produced only when the printer is printing.*

To ensure that the level of ozone emissions is safe, laser printer manufacturers install a special filter. Laser printers that operate without a corona wire emit only a negligible amount of ozone and do not require a filter.

All Apple laser printers are manufactured to comply with Underwriters' Laboratories (UL) guidelines for ozone emissions. Some Apple LaserWriter® printer models (the LaserWriter, the LaserWriter Plus, and all LaserWriter II models) have corona wires and therefore are equipped with ozone filters; others do not. Contact your authorized Apple service provider if you're uncertain about your particular model.

If your LaserWriter printer has a corona wire, Apple recommends that the ozone emission control system be checked and the ozone filter be replaced every 50,000 pages. (Refer to your Apple LaserWriter owner's manual for instructions on determining the current page count.) Dusty conditions or damage to the filter may necessitate more frequent filter replacement. Contact your authorized Apple service provider for information about performing the ozone check and filter replacement.

Proper installation of your laser printer will help to keep ozone concentrations at a safe level. Place the printer in a well-ventilated area; air circulation is especially important if multiple laser printers and/or photocopy machines are located in the same area, and in regions with low humidity. If possible, place the printer in an open work area rather than in an individual's work space. And make sure the fan exhaust blows away from people who sit nearby.



Tips for comfortable computing

When using a computer as part of your job—or even for personal tasks—it's easy to spend a long time sitting in one position looking at the screen. Just as the best running shoes can't prevent physical problems if you run too much, even an ideal computer setup can't prevent fatigue and soreness if you sit at your desk for hours at a time.

It may take some conscious effort and discipline on your part, but it's important to take frequent breaks—even if they're only of short duration—to rest your eyes and move your body. Stand up and stretch. Walk around. And try to organize your work throughout the day so that you alternate using your computer with other activities that don't use the same muscle groups.

If your eyes feel dry while you're using the computer, blink them a number of times or close them tightly for several seconds. As with any visually intensive activity, to prevent muscle fatigue that can lead to blurred vision and headaches, occasionally look at objects much farther away than the display (20 feet [6 meters] or more). Of course, make sure you're wearing the right glasses or contact lenses if you need them, and have your eyes examined regularly.

And always, if you experience persistent pain while using your computer, consult a qualified health professional. Better yet, ask your health advisors for suggestions on developing healthy work habits now to prevent problems in the future.

Checklist for a healthy work environment

- Adjust your chair height so your feet are flat on the floor.
- Position your keyboard so your elbows are at the same height as the keyboard and your wrists have little or no tilt.
- Position your mouse at the same height as your keyboard.
- Set up your display so the top of the screen is at or slightly below eye level.
- Position the screen so it doesn't reflect glare into your eyes.
- Keep your screen clean.
- Make sure your display's brightness and contrast controls are properly adjusted.
- Place your laser printer in a well-ventilated area and make sure it receives regular maintenance.
- Alternate working at the computer with tasks that use different muscles.
- Take frequent breaks to rest your eyes and move your body.
- Visit a qualified health professional if persistent pain develops while using your computer.

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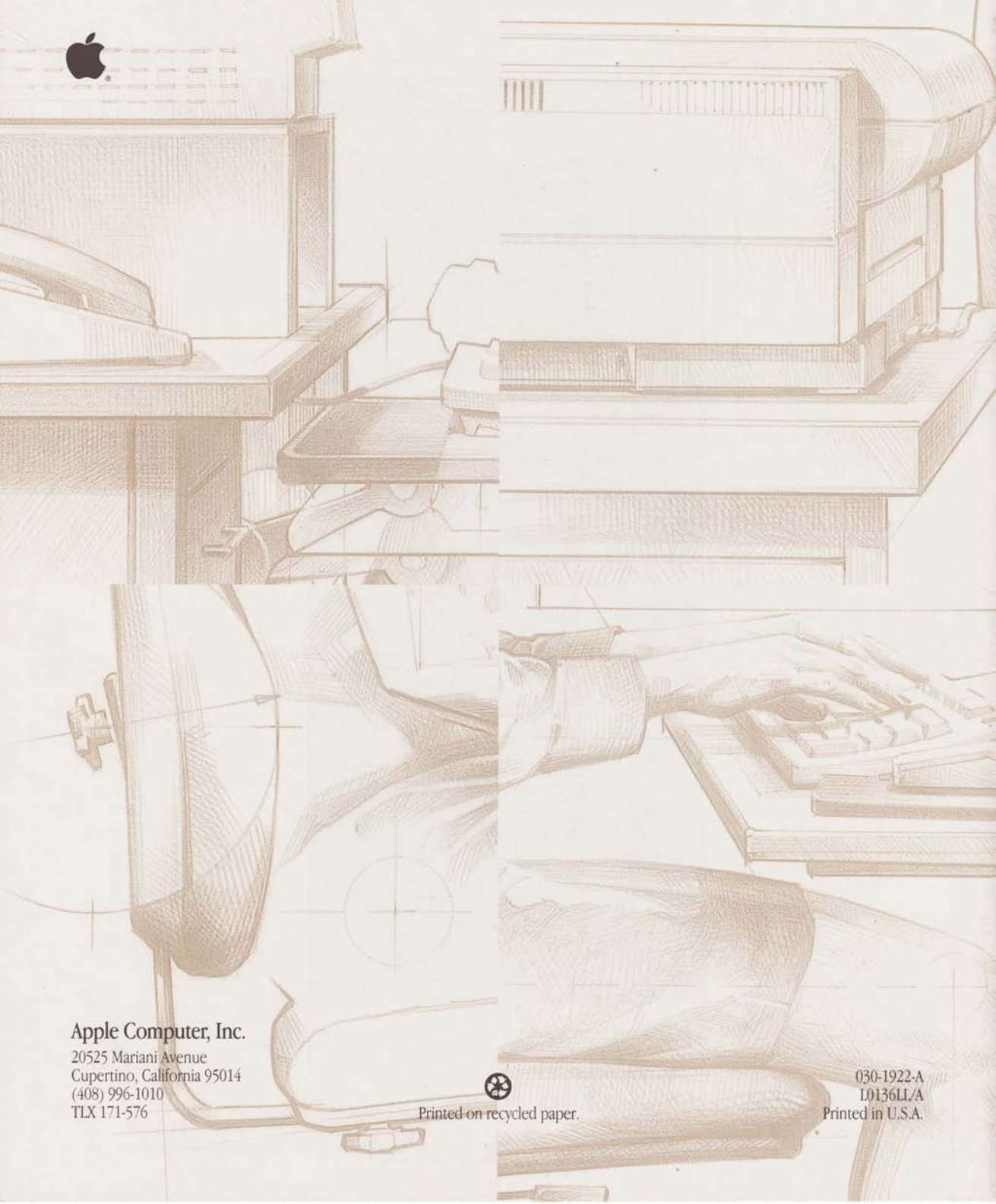

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